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ABSTRACT

The effects of the presence of others on 120 young children's performance of balancing skills were tested. The boys and girls, aged four, six, and eight, were tested under three different conditions: while acting "alone," in coaction (pairs), and alone before an audience. The tests were divided into simple and complex balance tasks, consisting of walking forward and backward on lines or balance beams of various widths. Results revealed that the presence of others appeared to arouse general drive and facilitated performance depending on the subject's age, skill level, tasks used, and environment provided. No significant differences between the sexes in balance performance were noted. In the spectator setting, the six-year-old subjects' performance was impaired when skill level was low, but enhanced when skill level was high. No significant difference between spectator performance and performance alone was apparent in the performance of the four-year-old subjects with the exception of their performance in the "alone" state. Overall, age was found to have strong effects on the measures tested. The results appear to support contentions that evaluation apprehension and past learning experiences are basic to the facilitation of performance. (Author/FG)

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The Effects of Class Organization Upon the Balance Performance
of Young Children

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Abstract

This field study using both simple and complex motor tasks tested the effects of the presence of others upon young children's dynamic balance performance. Boys and girls (N=120), ages 4, 6, and 8 years with high or low skill level, were tested while acting "alone," in coaction (pairs), and before spectators. The effect of the presence of others was significantly evidenced in both spectator and coaction conditions over the "alone" state with both 6- and 8-year-old children and in coaction with 4-year-olds. In the coaction setting with competition and modeling available, the performance of all three age groups was enhanced regardless of the subject's skill level. In the spectator setting, the 6-year-old subject's performance was impaired when skill level was low but enhanced when skill level was high. No significant difference in spectator performance over that of the "alone" state was apparent in the balance performance of 4-year-olds. Overall, between the sexes no significant difference in balance performance was noted.

Social facilitation has often been the subject of research which has centered on college-age students and young adults as subjects, but little testing has been done focusing on young children. In the many studies that were conducted, the presence of others often appeared to improve individual performance (Triplett, 1897; Allport, 1920; Travis, 1925; Abel, 1938; Bergum & Lehr, 1963). But circumstances were reported in some studies

where enhancing effects did not occur in either audience or coaction conditions (Gates, 1924; Dashiell, 1930; Husband, 1931; Pessin, 1933; Singer, 1965). Past research seemed contradictory until Zajonc (1965) noted a subtle consistency in the results of the testing. He ascertained that the emission of well-learned responses is facilitated by the presence of others while that of poorly-learned responses is impaired. The key to the enigma was the distinction in the kind of dominant responses being enhanced.

Based on the tenets of the Hull-Spence behavior theory, Zajonc declared that an audience enhances the emission of incorrect responses when learning is in the early stage and skill level is low. But when learning is in the late stage and skill level is high, correct responses dominate, and thus performance is enhanced. Zajonc's findings were substantiated in the studies of Ganzer (1968), Martens (1969), Martens and Landers (1969), Hunt and Hillery (1973), and Landers, Brawley and Hale (1978).

Cottrell (1968) modified Zajonc's drive arousal theory when he differed on the cause of motivation, whether due to nature or nurture. Cottrell contended that the presence of others is arousing only when the presence of others creates in the subject anticipation of positive or negative outcomes. Researchers distinguish between the original theory and its modification by labelling them Zajonc's drive arousal or social facilitation theory and Cottrell's learned drive or social evaluation theory.

According to Cottrell, if the learned drive interpretation is correct, then any demonstration of audience or coaction effects should contain cues for rivalry and/or evaluation, which if not

there would eliminate the effects of the presence of others. Many investigators have supported Cottrell's evaluation theory and some have extended it (Henchy & Glass, 1968; Klinger, 1969; Paulus & Murdoch, 1971; Martens & Landers, 1972; Sasfy & Okun, 1974; Paulus & Cornelius, 1974; Rittle & Bernard, 1977; Grush, 1978). In an extensive review, Geen and Gange (1977) declared that the bulk of evidence has indicated that evaluation potential is an important variable in social facilitation. This generalization does not discount Zajonc's "mere presence" hypothesis, however, but means that anticipation of evaluation may add to the effects of the "mere presence" of others.

Few research studies have been done on skilled and unskilled performance relative to the difference between the uses of the two paradigms, coaction and acting in the presence of spectators. Moreover, only a few studies have tested the principles of social facilitation, using children as subjects. Yet investigators (Ridenour, Herkowitz, Clark, Teeple & Robertson, 1978; Bailey, 1978; Cratty, 1967c) have warned against extrapolating to children the results of the testing of adults. Generalizations should be avoided, they declared, in considering children scaled-down adults. In the few children's studies that have been made, generally little difference in performance between the sexes has been reported (Hanson, 1965; Kahms, 1966; Chevrette, 1968; DeOreo, 1971; Alderman, 1974; Clifton, 1978). Obviously, it is imperative that more field studies be done using children as subjects if educators are to harness the motivation potential of the environment to improve children's performance.

METHOD

This field study investigated the effects of acting "alone," together (coaction), and before spectators who could be perceived as having evaluative potential upon the performance of 4-, 6-, and 8-year-old boys and girls with high or low developmental dynamic balance skill levels. Psychomotor achievement was compared on simple and complex balance tasks using a paradigm common in classroom organization. Individuals performed "alone," together, and alone before an audience. No admonition or directives were given overtly, advising the subjects to be alert that they were being evaluated. The experience was provided, however, which might trigger evaluation apprehension, gained from the results of past experience.

Subjects

For this study, 120 girls and boys, ages 4, 6, and 8 years, representing a homogeneous, non-Title I, nondisadvantaged, working-class population, were randomly selected by pretest from volunteer classes of preschools and elementary schools within Summit County, Ohio. The selected subjects could be described as: (a) two groups, male and female, of 60 subjects each; or (b) three groups, of 40 youngsters each, whose ages were 4, 6, and 8 years; or (c) two groups of 60 children each, with developmental dynamic balance skill levels of high or low.

Tasks

Six tasks were used to test children's balance performance and were administered in three different conditions: acting "alone," in

coaction, and alone before an audience. The test consisted of simple and complex balance tasks based on the balance portion of the DeOreo Fundamental Motor Skill Inventory (DeOreo, 1976). Three tasks were identified as simple: walking forward on a 1" line, walking backward on the same line, and walking forward on a 4" balance beam. The three complex tasks consisted of walking backward on the 4" beam and forward and backward on the 2" beam. Use of the line was an addition to the original test.

Scores were given on both product and process components of the dynamic balance test. The product factors were the objective measures of (a) distance in feet and inches to the closest 3" mark traveled, until the first time the performer stepped off the line/beam on each task. The process component was described as the subjective measure of how the performer accomplished a certain motor task. The four process factors were: (a) speed of walk, (b) pattern of walk, (c) flailing of arms, and (d) shifting of posture during the walk.

Design

The study was a two (sex: male and female) by three (age: 4, 6, and 8 years) by two (skill levels: high and low) by three (audience situations: "alone," coaction, and spectator) factorial design, with repetitions in testing (two performances for each simple and complex task in each of three situations). The Tukey test of Honest Significant Difference (HSD) was employed to ascertain significance in test results at the .05 level.

The design permitted the critical examination of the effects of the four independent variables (sex, age, skill, and situation)

on the dependent measures of balance performance (distance to the first step-off, number of step-offs, speed of walk, arm flailing, and postural shifting in executing the simple and complex tasks).

The statistical analyses conducted on these test scores were threefold: correlations between and within the simple and complex task measures; $2 \times 3 \times 2 \times 3$ analyses of variance with repeated measures on the last factor (situation) for each of the 21 dependent measures; and a $2 \times 3 \times 2$ (audience condition excluded) multivariate analysis of variance for 12 of the measures (total scores, which were the simple sums of the simple and complex scores, were not analyzed using MANOVA).

Procedure

Within a two-week period, the test was administered to small peer groups of like-skilled pairs of children, under each of the three conditions: "alone," coaction, and spectator. Repetitions in testing occurred with the design requirement of two performances for each simple and complex task in each of the three settings.

RESULTS

In this study the presence of others appeared to arouse general drive, facilitating performance according to the subject's age, skill level, tasks used, and environment provided. Overall, social facilitation effects were demonstrated in both coaction and spectator conditions over the "alone" state. In general, children of ages 4, 6, and 8 years exhibited better performance in coaction over the other two situations especially on process tasks. Only enhancement of performance over the "alone" condition was evidenced

by all three groups of children in coaction, while both decrement and enhancement of performance according to skill level appeared in the spectator paradigm with 6-year-olds. The strongest effect of the presence of others was evidenced with 8-year-olds, especially the high skilled, more than all other children. The least effect of the presence of others was apparent with 4-year-olds.

On each of the 21 dependent variables tested, abundant significant differences were demonstrated due to the effect of age. As a whole, older children exhibited better performance scores than younger children; the greatest difference in performance was between 8- and 4-year-olds on all tasks. On complex tasks, a significant difference in performance was evidenced between 8- and 6-year-olds and between 6- and 4-year-olds. The best age discriminators, in general, appeared to be distance to the first step-off in simple and complex tasks and number of step-offs on complex tasks.

While children of ages 6 and 8 years walked better in both coaction and spectator settings compared to "alone," in contrast, no significant performance difference between "alone," and the spectator setting was evidenced in the case of 4's. In no case was the "alone" performance of any age group significantly superior to task accomplishment in either condition where others were present.

In general, performance differed significantly between children of high and low skill levels favoring the highly skilled. The findings from the MANOVA supporting these results indicated that distance to the first step-off in simple and complex tasks served best to differentiate between performances of high and low skilled subjects. The univariate ANOVA demonstrated that high and low skilled children performed with significant difference on complex more than on simple tasks.

Overall, differences in simple and complex task performances between high and low skilled children were consistent over all situations. The intensity of the facilitation effect was evidenced especially in the spectator condition with high skilled 8-year-olds on complex tasks, even more than in coaction. In the spectator setting all high skilled children evinced an increment in performance on simple tasks except 4-year-olds. It is interesting to note that for both age and skill, the best discriminators were product, not process variables, predominant with complex tasks. The key discriminator between the three situations in relation to the subjects' ages and skill levels appeared to be the spectator condition with older children.

The dichotomous nature of performance according to skill level was a major finding of this study. High skilled 6-year-old children evidenced an increment in performance, while their low skilled counterparts demonstrated a decrement over the "alone" state on simple tasks in the spectator paradigm. These opposing findings of increment and decrement with the same aged children but with opposite skill levels signified evidence of the effect of social facilitation according to skill level. As to differences between the sexes, overall, no significant data suggested that males and females perform simple and complex dynamic balance tasks differently. The only instance where a sex difference was obvious in any of the three age groups was on pattern of walk with low skilled males of age 4 years. Their foot pattern was less mature than that of their female counterparts.

DISCUSSION

Age

In this study age was found to have strong effects upon the measures tested. For complex tasks only, a consistent developmental trend was evidenced, with each older age group performing better than the younger. For simple tasks, on the other hand, developmental differences leveled off between the 6-year-olds and 8-year-olds classified as high in skill. But for the low skilled, greater evidence of developmental differences was found on the simple tasks, although not on all measures.

Based upon the results of this study, it appears that for the age groups tested, dynamic balance of a more simple nature stabilizes at 6 to 8 years of age. The child then proceeds to the development of more complex balancing abilities.

Skill

The findings relative to skill level were tied closely to the ages studied, as demonstrated through the significant interaction between age and skill. Although, in general, the high skilled children performed significantly better than their low skilled counterparts, this finding was not true for all age groups. Between low and high skilled balancers, only 4-year-olds evidenced consistent significant performance differences.

As a whole on simple task performance, high skilled youngsters demonstrated minimal age differences, while the low skilled evidenced greater age differences than their counterparts. The reverse was apparent on complex tasks. The high skilled demonstrated significant task performance differences over age with

8- over 4- and 6- over 4-year-olds. But with the low skilled children on complex task performance, age differences were minimal. Between high and low skilled children of the same age, only 6-year-olds on simple tasks demonstrated significant performance differences. The key discriminator of skill was distance to the first step-off on both simple and complex tasks.

Setting

Results of testing coaction and spectator conditions appeared to contrast on several points. The coaction setting appeared as a facilitator of performance over the "alone" condition. The spectator setting may be seen as a disrupter of complex/poorly learned task performance and a facilitator of simple/well learned tasks. Coaction tended to be more constant than spectator and was modified less by the interaction of the setting with sex, age, and skill over the "alone" state. Overall, coaction demonstrated more performance difference over "alone" with simple tasks (arm flailing and postural shifting): spectator, with complex tasks (distance and step-offs). Process measures were more discriminating in the coaction setting; product, in spectator. The most constant measure on complex tasks in the paired setting was apparent in pattern of walk. Here, more than in spectator, children seemed to concentrate on foot control and attempted to perfect foot pattern. It appeared that because pattern of walk is well defined, can readily be observed, and requires less subjective judgment in testing, it is an effective discriminating measure for use in testing balance performance with young subjects.

The spectator condition affected product more than process measures on both simple and complex tasks. While coaction performance was especially enhanced by qualitative (process) measures, spectator performance was more affected by quantitative (product) measures. As a whole, children in the setting where one could take cues or compete with peers appeared to be motivated to improve performance; they were concerned with how they walked. Children, watched by others with evaluative potential, appeared to center attention on walking as far as possible before stepping-off and having as few step-offs as possible.

Sex

Overall, the treatment of sex was the most consistent independent variable considered and only rarely yielded a difference between the genders. It appeared that girls were at times more motivated than boys to display their abilities in the presence of others. In coaction, boys sometimes appeared more competitive and took better advantage of cues than did girls.

Cottrell's theory of social evaluation

The results of this study appeared to support Cottrell's modification of Zajonc's drive theory. Cottrell contended that evaluation apprehension and past learning experiences were basic to the facilitation of performance. It is noteworthy that the comparatively inexperienced 4's evidenced no significant change in performance between spectator and "alone" settings, while the older children, especially the 8's were repeatedly cited as having been facilitated in the presence of others over the "alone" state. While

none can deny the genetic effect of maturation (Zajonc's drive theory) on performance, yet in this study, substantiation was also evidenced of the impact of Cottrell's evaluation apprehension. In summary, because in no age group tested was the "alone" performance of simple and complex tasks significantly superior to task accomplishment in the presence of others, social facilitation appeared as a real force in this study. Employing the right situation for performance according to age and skill level presents an important challenge to educators.